ENTOMOLOGICAL NEWS

VOLUME LXX, 1959

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PUBLISHED BY
THE AMERICAN ENTOMOLOGICAL SOCIETY
THE ACADEMY OF NATURAL SCIENCES
PHILADELPHIA, PENNSYLVANIA, U. S. A.
1959

The numbers of ENTOMOLOGICAL NEWS for 1959 were mailed at the Post Office at Lancaster, Pa., as follows:

No. 1—January	January 15, 1959
No. 2—February	February 14, 1959
No. 3—March	March 11, 1959
No. 4—April	April 3, 1959
No. 5—May	May 18, 1959
No. 6—June	June 15, 1959
No. 7—July	July 16, 1959
No. 8—October	September 24, 1959
No. 9—November	November 3, 1959

The date of mailing the December, 1959, number will be announced on the last page of the issue for January, 1960.

ENTOMOLOGICAL NEWS

JANUARY 1959

Vol. LXX **No. 1**

CENTENNIAL YEAR
THE AMERICAN ENTOMOLOGICAL SOCIETY
1859—1959

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PUBLISHED MONTHLY, EXCEPT AUGUST AND SEPTEMBER, BY
THE AMERICAN ENTOMOLOGICAL SOCIETY
PRINCE AND LEMON STS., LANCASTER, PA.
AND
1900 RACE STREET, PHILADELPHIA 3, PA.

Subscription, per yearly volume of ten numbers: $5.00 domestic; $5.30 foreign; $5.15 Canada.
Second-class postage paid at Lancaster, Pa.

ENTOMOLOGICAL NEWS

ENTOMOLOGICAL NEWS is published monthly, excepting August and September, by The American Entomological Society at Prince and Lemon Sts., Lancaster, Pa., and the Academy of Natural Sciences, 1900 Race Street, Philadelphia 3, Pa., U. S. A.

PHILIP P. CALVERT, Editor Emeritus. R. G. SCHMIEDER, Editor. Editorial Staff: H. J. GRANT, JR., E. J. F. MARX, M. E. PHILLIPS, and J. A. G. REHN.

Subscription price, per yearly volume of 10 numbers: Domestic, $5.00; Foreign, $5.30; Canada, $5.15—U. S. Currency.

SUBSCRIPTIONS: Communications and remittances to be addressed to **Entomological News, 1900 Race Street, Philadelphia 3, Pa.**

ADVERTISEMENTS: Rate schedules available on request. **Address, Fred B. Jacobson, Advertising Manager, Entomological News, 1900 Race Street, Philadelphia 3, Pa.**

MANUSCRIPTS and all communications concerning same should be addressed to **R. G. Schmieder, Zoological Laboratory, University of Pennsylvania, Philadelphia 4, Pa.**

The receipt of all papers will be acknowledged and, if accepted, they will be published as soon as possible. Articles longer than eight printed pages may be published in two or more installments, unless the author is willing to pay the cost of a sufficient number of additional pages in any one issue to enable such an article to appear without division.

ILLUSTRATIONS: Authors will be charged as follows: For text-figures, the cost of engraving; for insert plates (on glossy stock), the cost of engraving plus printing. Size limit, when printed, 4×6 inches. All blocks will be sent to authors after printing. It is not advisable to print half-tones as text-figures.

TABLES: The cost of setting tables will be charged to authors.

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Copies	1–4 pp.	5–8 pp.	9–12 pp.	13–16 pp.	17–20 pp.	Covers
50	$3.95	$6.33	$ 9.89	$10.28	$13.44	$4.31
100	4.74	7.51	11.86	12.65	16.21	5.89
Add'l 100	1.58	2.36	3.94	4.74	5.54	3.16

Plates printed one side: First 50, $3.15; Additional 100's, $2.37.

Transportation charges will be extra.

ENTOMOLOGICAL NEWS

VOL. LXX JANUARY, 1959 No. 1

The First Hundred Years

This year the American Entomological Society has the distinction of celebrating its one hundredth anniversary. And it is indeed a distinction, for in 1859 no other society devoted exclusively to insect study had been formed in America.

There is a sort of magic in the phrase, "a hundred years old"; so much can happen in that time. But the three men who met in Philadelphia on the night of February 14 of that year—to form an entomological society—could hardly have imagined the progress that would be made in that field in the next hundred years. Science was on the move but no one knew the momentum it would achieve nor the mass of data it would compile.

These three conspirators, Ezra T. Cresson, James Ridings and George Newman, decided that before taking final action, they would invite a larger group to participate in their project. As a result, a second meeting was held on February 22nd, at which fifteen persons were present. They unanimously resolved to form a society, and appointed a committee to draft a constitution and by-laws and to propose a suitable name for the organization. At the next meeting, held on March 1, 1859, this committee made a full report, suggested the name, "THE ENTOMOLOGICAL SOCIETY OF PHILADELPHIA," and presented a draft of a constitution and by-laws, all of which were accepted, after slight modifications.

It is almost always true that the historical researcher finds conflicting statements, or at least what seem to be uncertainties in recorded data. In this respect the founding date of the Society is no exception. The first record in its Minutes is of the original meeting of Cresson, Ridings and Newman on February 14, 1859. These three men were recorded in that place

as the "founders," yet at the following meeting of February 22nd, the fifteen men present unanimously resolved to *form* such a society, and only on March 1 was it given a name, and a constitution adopted. One year later—February 27, 1860—a speaker referred to that meeting as "the anniversary of the organization of the Society." As this meeting was not on the same date as any meeting of the previous year we can only assume that he referred to the March 1st meeting, the nearest comparable date. For this and other reasons it seems logical to say that the Society was founded on March 1, 1859, though the writer is in no position to proclaim this as official.

The American Entomological Society has been a rather unique organization. The chief initial object of the members, as expressed in the constitution of 1859, was the advancement of entomological science by "ascertaining the name, locality, habits, time, etc., of insects found in the United States of America, and communicating the same to the Society." This is still an aim, though we would probably not so express it today.

The early members quite obviously thought of their meetings and other activities as a medium of self-instruction and mutual assistance. No course in general entomology was then taught in any American college, and knowledge in the field was of necessity largely acquired by observation and the reading of the few books on the subject which were available. Almost from its beginning, however, the Society developed for itself three main functions: the conduct and publication of research, the accumulation of a good library, and the building of a collection of insects. The two last were necessary to the accomplishment of the first, and the furthering of all three still remains the prime objective.

Society Publications

The publications as a whole have been outstanding in their field. While the bulk of them represent the results of taxonomic research, all closely related fields have been included. Less than two years after the founding of the Society, there was talk of producing a new entomological journal, and something

was very quickly done about it. John Meichel, a member, had offered to do the type setting and press work if the Society would purchase a hand printing press. At the same meeting a resolution was adopted to establish a Publication Fund. Just six weeks later money had been raised, a press purchased and reported "in good condition to print anything the Society may order." This press is still in the possession of the Society and on it were printed most of the first six volumes issued.

The printing of the new journal was promptly started, and it was called the *Proceedings of the Entomological Society of Philadelphia.* Six volumes, now very rare, were printed from 1861 to 1867. In the latter year the name of the Society was changed to the *American Entomological Society,* and the name of the journal to the *Transactions of the American Entomological Society.* This journal, issued quarterly, has been continued to the present time, and the 1958 volume was the eighty-fourth.

In 1865 a new serial publication was undertaken. It was wished to diffuse information in popular form on insects which were destructive or beneficial to vegetation. The *Practical Entomologist,* designed particularly for farmers, was started. Only two volumes were produced, and though at first there was a great demand for it—when distributed gratuitously—the resources of the Society would not permit it to be continued. Though it contained much valuable information, this early venture into publication on economic entomology was of short duration.

In 1890 *Entomological News* first made its appearance, and the 69th volume of this serial was published in 1958. In its 69 years it has performed an extremely valuable function in publishing short articles, news notes, and for many years the most usable and complete record of current literature in the field.

The Memoirs of the American Entomological Society were begun in 1916 as a vehicle for the publication of monographic works. Fifteen numbers have appeared, and the sixteenth may have come from the press before this is printed.

Thus, in the hundred years of its existence the Society has issued 176 volumes of serial publications—in four different

series—in addition to 30 or 40 separate pamphlets and volumes. This is no mean accomplishment for a private society with no public support, whose active membership has seldom exceeded 100. This large mass of publications was made possible only because of significant early gifts—some restricted to the Publication Fund—by Dr. Thomas B. Wilson, his brother Rathmel Wilson, and by Dr. George H. Horn. Also the careful handling of the Society's resources by its officers, and the gradual building up of its permanent publication funds contributed much to this end.

The Library

A library for the Society was begun in December, 1859. The first volume acquired was presented in that month by Prof. S. S. Haldeman. It was a copy of F. E. Melcheimer's Catalogue of the described Coleoptera of the United States, 1853. In the hundred years since then the Society's library has grown into one of the most important collections of systematic entomological literature in America, particularly in the older and rarer categories. There are now about 10,000 volumes and many thousands of separates and pamphlets. Many valuable journals have been acquired through exchange of Society publications for those of other organizations. The library is deposited in that of the Academy of Natural Sciences of Philadelphia.

The Insect Collection

An "Entomological Cabinet" or collection was started during the Society's first year. Cabinets for storing it were built by James Ridings, and the first gift of specimens was 100 species of Coleoptera, by Dr. T. B. Wilson. During the years since, many donations of specimens have been made and a considerable number purchased. The two largest single lots were presented by George H. Horn (Coleoptera) and by E. T. Cresson (Hymenoptera). These were each made up of over 60,000 specimens. The present collections, now deposited with those of the Academy of Natural Sciences, include a total of from three to five hundred thousand specimens. Many types are among them.

Association with Academy

About seventeen years after its founding the Society found itself quite pressed for space in the quarters it then occupied on South Thirteenth Street. As a consequence it made a move which has undoubtedly had a great deal of influence on its history and development. The Academy of Natural Sciences of Philadelphia was just moving into a newly completed building where it is still housed. Upon being approached the authorities at the Academy made an agreement with the Society, permitting it to occupy quarters in the new building, where, after over 80 years, it still remains. The arrangement has doubtless been of considerable advantage to both organizations, their libraries, collections and staff supplementing each other. Though maintaining its corporate identity the Society became the "Entomological Section" of the Academy in 1876, and so remained until 1924 when all Academy sections were dissolved.

Membership

The membership of the Society has never been large, but from the first has included the names of many men who stood high as research workers, particularly in taxonomic entomology. There have always been two classes of membership—resident and corresponding. Generally speaking, any one who has been sufficiently interested in entomology to associate himself with the Society—and pay his dues—has been welcomed to its rolls. As a result, there has always been a considerable number of members to whom the field represented an avocation rather than a profession, and a surprising number of significant contributions in research and publication has come from such sources. This was especially true in the earlier days when most of the members were amateurs rather than professionals.

The present resident members number about 115, and the correspondents 27. The latter are eminent entomologists scattered over the world.

The initial objects of the Society, as stated earlier, would certainly suggest that the members would be those interested funda-

mentally in insects themselves, their identification, classification and ecology. A hundred years ago that was about the only kind of entomologist there was. They have, through the years, done the great mass of basic work so necessary to the development of the army of economic entomologists whose activities today dominate the science. The members of the Society are still, for the most part, that kind of men—who do that kind of work. It will never be completed.

Though the organization has prospered and grown over the years, whatever eminence it has achieved may be laid largely at the doors of the many local members who loyally labored through the years to achieve such advances. They often sacrificed much in time, labor and personal funds. With regard to its finances the Society is in much the same position as a university. President Lowell of Harvard was once asked: "How much money can a university use?" He replied that the same answer applied to that as to the question: "How much whiskey can a Scotchman drink?—any given amount."

MAURICE E. PHILLIPS

Records of Chaetopsylla lotoris (Stewart) (Siphonaptera) from New Hampshire

By R. L. BLICKLE, New Hampshire Agricultural Experiment Station, Durham, N. H.

The following locality records for *Chaetopsylla lotoris* (Stewart) from New Hampshire are listed for the first time. One male, *ex Lynx rufus rufus,* Sullivan, N. H., January 23, 1955. Five males and five females, *ex Procyon lotor,* Strafford, Bow Lake, N. H., February 27, 1957. One male and one female, *ex Lynx rufus rufus,* Conway, N. H., January, 1958. All specimens collected by Dr. C. L. Stevens. This species has been recorded by Johnson, 1955 (Pan. Pac. Ent., XXXI (3): 93–104) from the following states: Maine, New York, Minnesota, Pennsylvania, Iowa, Illinois, and North Carolina.

Two New Species of Fireflies (Coleoptera: Lampyridae)

By FRANK A. MCDERMOTT, Wilmington, Delaware

The two rather unusual lampyrids described below were found in the collection of Cornell University, and I thank Dr. Henry Dietrich for the privilege of describing them.

I

The insect described below is only the fourth species to be assigned to the genus *Lucernuta,* and the smallest of the four. *Lucernuta* was separated from the large Asian genus *Pyrocoelia* by E. Olivier (Revue Scientifique du Bourbonnais, 1911, Vol. 24, p. 65) by virtue of the 8th ventral abdominal segment being emarginate instead of mucronate as in the latter genus, a rather uncertain criterion in the absence of any other markedly different characters. In Pars 9 of the Coleopterorum Catalogus (1910) and previously, Olivier had combined *Pyrocoelia* under *Lucernuta.*

Lucernuta hammari n. sp.

Type locality, São Paulo, BRAZIL. No date or collector's name.

Source, Hammar Collection, Cornell University.

Type No. 3481, Cornell University.

Over-all dimensions, *ca.* 9.0 mm. long by 4.0 mm. broad.

Outline elliptical. Body flat (artifact?).

Pronotum 2.3 mm. long by 3.6 mm. broad; outline parabolic. Forward edge reflexed; base bisinuate. Anterior median third colorless and transparent, except for a narrow median brown discoloration which widens toward apical margin; eyes visible through the transparent areas. Disk convex, bearing two large, roughly elliptical, cream-colored spots separated by a triangular brown vitta, broadest at base where it darkens to black, and extending forward a little on the lateral margins of the cream-colored areas. Lateral extensions flat, translucent brown; these

and the transparent areas coarsely and densely punctate; convex disk less pronouncedly so. Short, fine pubescence.

Scutellum dark brown, edged black; apex acute. Mesonotal plates dull dark brown. Central portion of scutellum and inside edges of mesonotal plates very dark red.

Elytra 6.65 mm. long by 2.05 mm. broad; widest at midlength; very flat (artifact?). Wide explanate margins, becoming evanescent at about apical 5th. Epipleura very wide, the interior ridge tapering rapidly to join the inner edge of the explanate margin. Lateral edges narrowly brown; explanate margins and nearly equal width on disk nearly transparent, darkening toward suture. On each elytron a dark brown vitta beginning at base and becoming fainter toward the apex. Elytra appear darker over wings and body. Brown portions coarsely rugose; transparent portions finely punctate; submarginal line of coarse punctures. Rather long, oblique pubescence, not dense but particularly marked at suture and lateral edges.

Frons very dark brown, slightly concave; 0.97 mm. across eyes, 0.56 mm. between them; eyes mediocre and head rather small. Maxillary palpi small, brown, outline conoidal. Mandibles very small and project ventro-posteriorly (artifact?); apical portions very slender.

Antennae 3.6 mm. long; 11 articles; brown, hairy, slightly compressed.

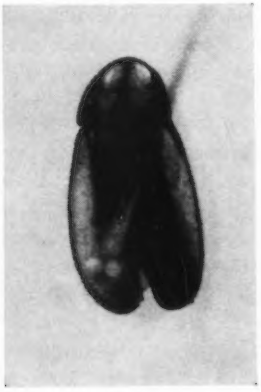
Ventral surface brown, including legs; hairy. Ventral abdominal segments 6 and 7 each about 1.5 times as long as 5th, and probably luminous in life; 8 very small, emarginate; 9 ogival, brown. Dorsal segments 6 and 7 with lateral lobes; pygidium trilobed, very dark brown, hairy.

Abdominal spiracles dorsal.

Aedeagus: The exposed portion of the aedeagus is a rather simple structure consisting of two lateral lobes the edges of which appear to form a continuous loop in the ventral view, but in lateral view the tip is turned downward. The dorsal aspect is that of a narrow V with the median lobe projecting between the sides. See accompanying sketch.

Habitus: The accompanying photograph shows the rather unusual appearance of the insect.

Female not known.



Lucernuta hammari n. sp.

Actual length 9.0 mm.

II

The genus *Pteroptyx* was established by E. Olivier (1902) for lampyrids of the general form of *Luciola* but the males having the apical portions of the elytra folded down over the end of the abdomen and the last ventral segment more or less strongly trilobed or trisinuate. The elytra of the female are described as normal. In 1907 Olivier described only two species in this genus, *P. malaccae* (Gorham) and *P. testaceum* (Motsch.). Gorham described the peculiar structure of the terminal abdominal segments of *malaccae,* which he regarded doubtfully as the female. Olivier's sketch of the abdomen of *testeceum* (1907, Pl. 3, fig. 11) does not show such a structure, the segments being of the form normal for *Luciola.* In 1910 Olivier listed nine species, four more being transferred from *Luciola,* and in 1911 he mentioned that one more new species

had been described; since then three more have been described, from Indo-China and Sumatra. Five of the species are from New Guinea. *Pteroptyx* is obviously close to *Pyrophanes* in the structure of the terminal abdominal segments, although in the latter it is the pygidium that is involved in the structure, and the elytral apices are not deflexed.

In the collection of Cornell University there is a single specimen which represents a new species of *Pteroptyx,* and it is described below as *P. papuae.* It is somewhat difficult to decide whether this specimen is male or female. There is no partially extruded aedeagus, or ovipositor; the relatively large eyes indicate a male. Gorham notes that his Malacca specimens and one of his Madras specimens of *P. malaccae* had ventral abdominal segments much as described for the present species, while another Madras specimen had an abdomen normal for a female *Luciola.* He refers to the elytra as "obliquely truncate at the apex," which is the way they appear when viewed from above. In *P. cribellata* E. Oliv. the last ventral segment is described as trilobed and ciliate; in *P. microthorax* E. Oliv., with two deep oval emarginations separated by a long narrow lobe with a truncate apex; and in *P. pupilla* E. Oliv., as divided into three slender teeth or mucrons. All three of these species are from New Guinea. *P. antennata* E. Oliv., also from New Guinea, has the last ventral of the male medially aculeate, a description which would apparently apply also to *P. testaceum* (Motsch.) of the East Indies. The last ventral segment of the female of *P. cribellata* is described as being truncate triangular. From these descriptions it would appear that this specimen and also those of Gorham having a similar abdominal structure are males.

Pteroptyx papuae n. sp.

Type locality, Monda, Buna District, PAPUA. Collected by W. G. Bodenstein, December 28, 1943.

Type No. 3480, Cornell University.

Dimensions: 4.5 mm. long by 1.65 mm. broad. Outline probably parallel in life; in the specimen the elytra are slightly divergent.

Pronotum sub-rectangular, *ca,* 0.7 mm. long by 1.15 mm. broad. Densely and coarsely punctate; narrow longitudinal median channel; uniform dark brown except for four small, nearly circular, yellow spots, two near the middle of the disk and close to the median channel, and two, less distinct and somewhat more widely separated, near the basal edge; basal margin reflexed. Short, pale pubescence, especially pronounced on margins.

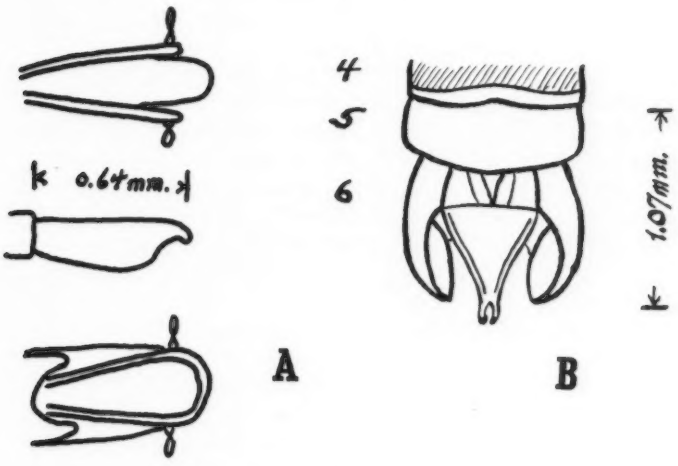


Fig. A. Aedeagus of *Lucernuta hammari* n. sp.

Upper: Dorsal view
Middle: Lateral view
Bottom: Ventral view

FIG. B. Terminal ventral segments of *Pteroptyx papuae* n. sp.

Scutellum brown; mesonotal plates dark yellow.

Elytra 3.83 mm. long by 0.82 mm. broad; divergent from scutellum (*vide supra*); coarsely punctate, the punctures tending to form longitudinal lines; fine, short, oblique yellow pubescence; translucent dark brown, appearing dull dark brown, almost black, over wings; very narrow explanate margins with a

single row of coarse punctures; no evident costae. Terminal lobes of the elytra bent downward and forward as though in life they embraced the end of the abdomen.

Frons brown, concave; 0.9 mm. across the relatively large eyes; intraocular margins widely divergent. Mouth parts small; mandibles slender; maxillary palpi relatively large, outline conoidal, flat on inner surface. Clypeus apparently connate, the epistome ending in a semicircular white margin.

Antennae incomplete, but apparently *ca.* 1.5 mm. long; nearly black, hairy, not compressed; 2nd article about $\frac{1}{2}$ as long as 1st and $\frac{2}{3}$ as long as 3d; 4 to 6 (all present) subequal in length.

Thoracic sterna brown. Pygidium ogival, convex, translucent yellowish.

Ventral abdominal segments 2 and 3 brown; 4 white on posterior edge; 5 white, luminous; 6 remarkable in consisting mainly of two long, white, arcuate lobes, apparently luminous, between which projects a flat, triangular, very hairy, nearly transparent lobe with a bifurcate apex, these apices being curved, and bent dorsad. See accompanying sketch. Abdominal spiracles not visible on the ventral surface.

Legs short, dark brown; claws simple; no tibial spurs visible.

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Gorham, H. S. 1880. Trans. Entomol. Soc. London, p. 101.
Olivier, E. 1902. Revue scientifique du Bourbonnais, Vol. 15, p. 72.
——. 1907. Wytsman's Genera Insectorum, Fasc. 53, p. 55.
——. 1910. Coleopterorum Catalogus, Pars 9, pp. 47–48.
——. 1911. Revue scientifique du Bourbonnais, Vol. 24, pp. 102–103.

Collembola from Colorado [1]

By Harold George Scott [2]

During recent systematic and distributional studies of the Collembola of New Mexico, seven collections were made in Colorado. These collections yielded one species new to science, one not previously recorded, and two already known from Colorado. All four are representatives of the Suborder Arthropleona, Family Entomobryidae. Most workers on the Collembola have not reported field data, so the ecological information presented is among the first to be published on these species. Collections were made by C. Clayton Hoff and Dwain R. Parrack,[3] Department of Biology, University of New Mexico, in connection with a study of the altitudinal distribution of insect and arachnid groups being directed by Dr. Hoff. The field work was aided by National Science Foundation Grant G-112. Specimens will be deposited at the Academy of Natural Sciences, Philadelphia, Pennsylvania.

Subfamily ISOTOMINAE Schaffer, 1896

Genus *Proisotoma* Borner, 1901

Proisotoma subsegmenta, sp. nov. Figure 1

Type Collection. Sifted from aspen litter, 9,200 feet, south of Cumbres Pass, ¼ mile north of the New Mexico state line, Conejos County, Colorado, 3 September 1952.

Description. Body elongate, not subglobose; segmentation distinct, without ankylosis; unique subsection between Abd II and Abd III; integument smooth; white marked evenly with blue; clothing of long and short setae; head prognathous; ratio

[1] A portion of a dissertation submitted to the Graduate Faculty of the University of New Mexico in partial fulfillment of the requirements for the Degree of Doctor of Philosophy.

[2] Training Branch, Communicable Disease Center, Bureau of State Services, Public Health Service, Department of Health, Education, and Welfare, Atlanta, Georgia.

[3] Present address: Zoology Department, University of Illinois, Urbana, Illinois.

of antenna to head as 4:3; antenna with five segments, ratio of antennal segments 4:4:4:3:4; postantennal organ of the simple isotomine type; eyes 8 and 8; eyepatches dark; mouthparts chewing; ratio of body segments approximately 10:40:35/20: 25:(10):20:35:15:20; tibiotarsus with indistinct distal subsegment; ratio of unguiculus to ungius 3:4; tenent hairs absent; unguis and unguiculus without teeth; furcula reaching far beyond collophore, exceedingly slender; ratio of manubrium to dens to mucro as 10:40:1; dental spines absent; dentes dorsally crenulate; mucro with three teeth, non-lamellate; anus terminal; anal spines absent; length 1.0 mm.

Discussion. This species is extremely unusual. It is the only known Collembola exhibiting more than six abdominal segments and the only known Isotominae with more than four antennal segments. Its furcula is remarkably long, reaching beyond the base of the head. It is suggested that the third abdominal section is not a true segment, but a subsegment of either the second or apparent fourth. This species was not taken in 41 samples from aspen in New Mexico.

Subfamily TOMOCERINAE Schaffer, 1896

Genus *Tomocerus* Nicolet, 1841

Subgenus *Pogonognathellus* Paclt, 1944

Tomocerus (Pogonognathellus) flavescens (Tullberg, 1871)

Diagnostic Characteristics. Postantennal organ absent; eyes 6 and 6; prostheca present; antenna shorter than body; unguis with 2–5 teeth; unguiculus with 0–1 teeth; tenent hairs 1; dental formula 0–II/4–9,11; length 5 mm.

New Colorado Records. From fir stump in woods, 10,000 feet; and from sifting woody debris of fir log, 10,000 feet, Cumbres Pass, Conejos County, 3 September 1952.

Recorded Distribution. Alaska, Cal., Colo., D. C., Ga., Ill., Ind., Iowa, La., Me., Md., Mass., Mich., Minn., Miss., Mo., N. H., N. J., N. M., N. Y., N. C., Ohio, Ore., Penna., Tenn., Tex., Utah, Va., Wash. Also Northwest Territories (Canada),

Europe, and Asia. This species was recorded from Colorado by Mills (1934, p. 83).

Subfamily ENTOMOBRYINAE Schaffer, 1896

Genus *Entomobrya* Rondani, 1861

Entomobrya purpurascens (Packard, 1873)

DIAGNOSTIC CHARACTERISTICS. Tibiotarsus with two rows of smooth hairs on inner surface; purplish to blue to tan to brown with varying amounts of yellow in different individuals; posterior parts of segments usually darker than anterior margins; antenna purplish, paler apically; legs and furcula usually dark.

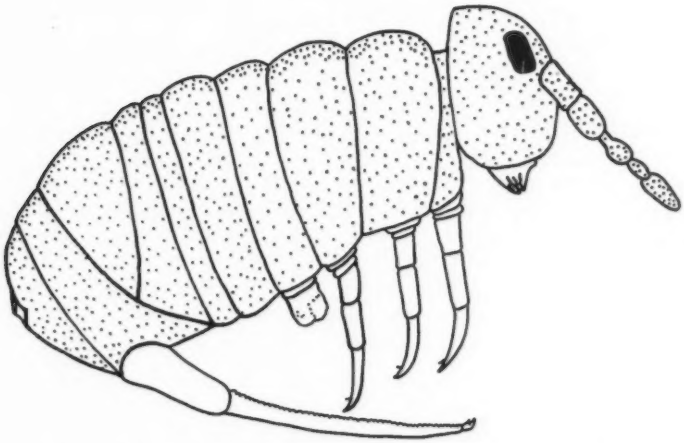

FIG. 1. *Proisotoma subsegmenta* sp. nov., lateral view of holotype.

COLORADO RECORDS. From beneath dung in open area of fir forest, 10,000 feet, at Cumbres Pass; and from old fir log, from beneath small log, and from beneath piece of wood, aspen grove, 9,200 feet, 5 miles south of Cumbres Pass, Conejos County, 3 September 1952.

RECORDED DISTRIBUTION. Colo., Del., Ill., Iowa, La., Me., Md., Mass., Minn., N. H., N. J., N. Y., N. D., Penna., Tenn., Tex., Utah, and Wisc. Also Ontario (Canada), and Europe. This species is recorded from Colorado by Christiansen (1958) as *Entomobryoides guthriei.*

Entomobrya marginata (Tullberg, 1871)

DIAGNOSTIC CHARACTERISTICS. Tibiotarsus without two rows of smooth hairs on inner surface; body essentially unicolorous without well-developed spots or stripes; not conspicuously clothed with dense dark-brown setae; gray to live-green to bluish purple.

COLORADO RECORDS. From sifting aspen litter, 9,200 feet, south of Cumbres Pass, north of New Mexico state line, Conejos County, 3 September 1952.

RECORDED DISTRIBUTION. Colo., Ill., Iowa, Mass., N. Y., Ohio, Tenn., Utah, Wash. Also Ontario (Canada), Europe, and Australasia. This species has not been recorded previously from Colorado.

SUMMARY

Four species of Collembola are recorded from Conejos County, Colorado: *Proisotoma subsegmenta* sp. nov., *Tomocerus flavescens, Entomobrya purpurascens,* and *Entomobrya marginata. Proisotoma subsegmenta* and *Entomobrya marginata* are new records for the state. The ecological information presented is among the first to be published on these species.

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Biological Notes on Chrysis (Ceratochrysis) enhuycki Cooper, and its Host, Leptochilus republicanus zendaloides (Robertson) (Hymenoptera: Chrysididae, Vespidae)

By KARL V. KROMBEIN, Entomology Research Division, Agricultural Research Service, U. S. Department of Agriculture

In 1952 Cooper described the odd little *Chrysis enhuycki* from five specimens which he collected at Princeton, New Jersey, and near Tarrytown, New York. There are 12 additional specimens in the collection of the U. S. National Museum from Rosslyn and Barcroft, Virginia, Washington, D. C., St. Louis and Kirkwood, Missouri, and Ashfork, Arizona. The Rosslyn and Barcroft specimens were reared by J. C. Bridwell from borings in twigs of sumach, *Rhus glabra.* The two specimens from St. Louis (Rau Nos. 3396, 3525) and the one from Kirkwood (Rau No. 9024) were apparently reared. The Arizona specimen was reared by H. S. Barber, June 17, 1901. There are no associated hosts with any of these reared specimens.

Bridwell's success in rearing the chrysidid from sumach led me to gather some infested stems and twigs on January 4, 1958, at Dunn Loring, Virginia, along the right of way of the Washington and Old Dominion Railroad near State Road 698. Only ten wasp nests were found among the hundred or more terminal twigs examined. When I split these twigs, five of them aroused immediate interest because they contained either earthen cocoons similar to those described by Rau (1928) for *Leptochilus republicanus zendaloides* or silken chrysidid cocoons similar to those from which Bridwell reared *Chrysis enhuycki.* The architectural details of these nests were as follows:

DL 2—a slightly sinuous boring 52 mm. long and 4 mm. wide through the pith of a twig having an outside diameter of about 10 mm.; a chrysidid cocoon 7 mm. long at the inner end of the boring with an empty space of 8 mm. above the cocoon; then a plug 17 mm. long of fine pith fragments;

above this a space of 20 mm. filled with earthen particles and other debris.

DL 5—dimensions of twig and boring about the same; an earthen cocoon 18 mm. long at inner end; above this an earthen partition of 2 mm.; then a chrysidid cocoon 7 mm. long; above this a section of fine particles of pith 25 mm. long and then an earthen plug.

DL 6—a twig about 13 mm. in diameter, the boring about 3 mm. wide; two earthen cocoons about 11 mm. long in the boring separated by a partition of fine particles of pith 9 mm. long.

DL 7—a twig 10 mm. in diameter with a boring through the pith 3 mm. wide and 238 mm. long; probably not the entire nest because lower end of twig with 22 mm. partition of fine particles of pith; above this an earthen cocoon 18 mm. long, then an earthen plug 13 mm. long; above this 22 mm. of fine particles of pith; then another earthen cocoon 13 mm. long; above this an earthen plug 10 mm. long; and finally an empty space of 140 mm.

DL 9—twig 12 mm. in diameter with boring down center of pith 3 mm. wide; upper 110 mm. empty, then 5 mm. of fine pith particles; then 5 mm. of earth and 15 mm. empty space; then an earthen cocoon 12 mm. long; then 20 mm. partition of fine particles of pith; then empty space for 50 mm. and a dead *Ectemnius* wasp.

After making the notes above, I taped the split halves of each twig together and placed them out of doors against a masonry surface having a southern exposure. On April 21 I examined them again. The condition on that date and subsequent development in each nest are as follows:

DL 2—chrysidid pupa fully colored except appendages on April 21; male *Chrysis enhuycki* eclosed on April 23 and left cocoon on following day.

DL 5—chrysidid pupa entirely pale on April 21; entirely dark except appendages on April 24; female *Chrysis enhuycki* eclosed on April 28 and left cocoon on May 2; the

earthen cocoon contained a pale vespid pupa with light tan eyes on April 21; on April 25 it was still pale with black eyes; on April 28 it was dark except appendages; on May 2 it was fully colored and ready to eclose, and the female *Leptochilus republicanus zendaloides* left the cell on May 5.

DL 6—dead prepupae in earthen cocoons on April 21.

DL 7—a pale, dark-eyed pupa of a parasite in each earthen cocoon on April 21; these pupae darkened very slowly; on May 5 a female *Epistenia coeruleata* Westwood [det. B. D. Burks] left one of the cocoons; the other pupa, also a female *Epistenia,* died during the pupal stage; the *Epistenia* larva feeds externally on the *Leptochilus* prepupa, sucking it dry.

DL 9—pale vespid pupa with light tan eyes in earthen cocoon on April 21; subsequent development as in vespid in DL 5 except that wasp failed to eclose entirely from pupal exuvia and died on May 7; it also was a female *Leptochilus republicanus zendaloides.*

The data given above do not definitely establish *Leptochilus republicanus zendaloides* as the host of *Chrysis enhuycki,* even though the two were reared from adjacent cells in one twig. The cells containing the chrysidids differed from those of *Leptochilus* in one important detail; they contained no earth, while the cells from which *Leptochilus,* or its prepupal parasite *Epistenia,* emerged held cocoons formed from earthen particles. There are two possible explanations for this difference in cell architecture. There may have been supersedure by another species of wasp in the one twig (DL 5) containing both the chrysidid and vespid or *Leptochilus* larvae may behave differently when starting to spin a cocoon than do those of the chrysidid. The architecture of two newly constructed, one-celled nests (82858 A, 9358 A) which I found in pith of sumach at Dunn Loring, Va., on August 28 and September 3, 1958, respectively, indicates that the latter conjecture is the more probable explanation.

One of these later nests (82858 A) was in a stem of smooth sumach (*Rhus glabra*) 10 mm. in diameter. The boring was

61 mm. long and 3 mm. in diameter. A few small particles of pith were packed at the bottom of the boring. Above this was a cell 7 mm. long containing five paralyzed, leaf-mining coleopterous larvae about 5 mm. long and a newly hatched chrysidid larva. Above this cell was a layer of fine particles of pith 9 mm. long, then a layer of earth 20 mm. long. The outermost 25 mm. of the boring contained three pieces of small twigs 10–12 mm. long. The beetle larvae consisted of one specimen of a species of *Brachys,* and four specimens of the leaf-mining cuculionid, *Prionomerus calceatus* (Say) [determined by W. H. Anderson]. The chrysidid larva died during the third instar.

The other nest (9358 A) was in a stem of staghorn sumach (*Rhus typhina*) 8–10 mm. in diameter. A boring 3 mm. wide and 20 mm. long terminated in an ovoidal cell 8 mm. long and 4 mm. wide. In the cell was a newly hatched vespid larva (injured when I opened the nest), eight last instar and two penultimate instar *Brachys* larvae belonging to the *ovatus* complex, 7 mm. long and four last instar leaf-mining chrysomelid larvae, *Chalepus* sp., probably *dorsalis* Thunb., of the same size [determined by G. B. Vogt]. The vespid egg shell was attached to the bottom of the cell by a short thread. The beetle larvae were rather lightly paralyzed, but were wedged in too tightly to move around. Above the cell was a partition of fine particles of pith only 1 mm. thick and then a layer of earth, most of which was lost during transport of the nest to the laboratory.

Apparently in a multi-celled nest the female *Leptochilus* lays an egg at the bottom of the boring and then stores a variable number of paralyzed leaf-mining larvae. Above this cell she constructs a partition of fine particles of pith and then an earthen plug, and then repeats this arrangement in succeeding cells, filling the uppermost part of the boring with a variety of debris. When the *Leptochilus* larva matures, it bores upward through the layer of fine pith particles and constructs a cocoon from the earthen plug above the pith, occasionally using all the earth in the cocoon or sometimes leaving the upper remnant of the earthen plug intact. However, in a parasitized cell the chrysidid larva merely spins its cocoon in the brood cell. This explana-

tion would account for the resulting disposition of nest contents found in the cells containing vespid cocoons in DL 5, 7 and 9 as contrasted to the arrangement of nest contents found in the cells containing chrysidid cocoons in DL 2 and 5.

The only possible way of establishing a definite host-parasite relationship between these two species from the reared material would be a demonstration that the cells of both the chrysidid and vespid contained fragments of the same or closely related species of prey. In DL 2 there were eight head capsules of leaf-mining buprestid larvae belonging to *Brachys*[1] attached to the outer surface of the cocoon. The chrysidid cocoon in DL 5 had no adherent prey remains, but in the loose, fine particles of pith above the outer end of the cocoon was a mass of six head capsules of *Brachys* larvae, apparently compacted there by the chrysidid larva when it began to spin. The earthen cocoons of the *Leptochilus* from DL 5, 7 and 9 had no adherent prey fragments. Maceration in alcohol of the larval meconial plugs at the inner end of these earthen cocoons showed many minute sclerotized fragments of insects. Mr. Vogt found nothing but *Brachys* remains among these fragments as follows: the meconial plug of the *Leptochilus* in DL 5 contained four mandibles of *Brachys* and numerous fragments of stippled integument of *Brachys* species probably belonging to the *ovatus* complex; one meconial plug from DL 7 contained ten mandibles of *Brachys* and numerous similar integumentary remains as in DL 5; the meconial plug from DL 9 contained eight mandibles of *Brachys* and numerous fragments of integument similar to those found in DL 5. The findings of identical remains in both the chrysidid and vespid cells leaves no doubt that *Chrysis enhuycki* is parasitic on *Leptochilus republicanus zendaloides*.

Rau (1928, pp. 400–404, fig. 52) has some notes on the nest of *zendaloides*. His nests were found in elder or sumach and agree in architectural details with my nests of the same species. Some specimens of prey were identified for him as leaf-mining

[1] I am indebted to my colleague George B. Vogt for identification of the prey remains in these nests. He believes that *Brachys* larvae having head capsules of this size would have an over-all length of about 10 mm.

chrysomelid larvae belonging to *Chalepus,* possibly *scapularis* Oliv. I expect that *Leptochilus* probably preys on a rather wide variety of leaf-mining coleopterous larvae, storing whatever is abundant during its nesting periods. Undoubtedly there are two or more generations a year in the Washington metropolitan area, for I have collected adult *Leptochilus* at Dunn Loring on June 12, July 10, and August 28. George Vogt points out that *Brachys* larvae probably would not be large enough to serve as suitable prey until July. Consequently *Leptochilus* from the overwintering generation in the Washington area would have to provision their nests with other larvae, perhaps *Chalepus dorsalis* Thunb. in locust, which matures earlier and is stored by another solitary vespid nesting in June, *Symmorphus canadensis* (Sauss.).

Additional observations are required to establish whether the *Leptochilus* female excavates her own boring in the pith or merely takes over the abandoned boring of another insect. The finding of a dead *Ectemnius* wasp at the bottom of nest DL 9 suggests that *Leptochilus* may utilize pre-existing borings.

Rau lists *Toxophora amphites* Wlkr., *Rhydinofoenus tarsatorius* (Say), *Epistenia osmiae* Ashm., and *Chrysis* (*Olochrysis*) sp. as parasites of *Leptochilus,* but gives no details concerning them. However, there is evidence that Rau's specimens 3396 and 3525, referred to above, might have been the species of *Chrysis* (*Olochrysis*) reared from *zendaloides.* Reference to the Rohwer correspondence files in the Bureau of Entomology shows that 3396 and 3525 were reported to Rau as *Chrysis* (*Olochrysis*) sp. in letters dated December 13, 1917, and January 6, 1919, and, further, that 3395 [2] was reported as *Stenodynerus zendaloides* Robt. Rau did not include field note numbers in his published works and habitually destroyed the field notes

[2] The consecutive lot numbers 3395 and 3396 do not signify insects from adjacent cells of one nest. Apparently Rau numbered all specimens from one nest with the same number. His photograph of a nest of *Leptochilus* with several cells bears the number 4089 (Rau, 1928, fig. 52 b). However, consecutive lot numbers might indicate nests of the same species.

after publication of his observations. His specimens now can be associated with the articles by inference only.

It is possible that the Ashfork, Arizona, specimen of *enhuycki* was reared from *Leptochilus rufinodus* (Cresson). In the National Museum there is a specimen of *rufinodus* pinned with an earthen cocoon and bearing printed labels Ashfork, Arizona, June (H. S. Barber). Attached to the pin is a penciled note in Barber's handwriting indicating that the cocoon was found in a wild sunflower stem on June 18, that the wasp emerged on June 25, and then a cryptic phrase, "Chrysis probably parasitic on other." This note might refer to the Ashfork specimen of *C. enhuycki,* and would therefore indicate Barber's suspicion that the chrysidid had parasitized another specimen of *rufinodus.*

Addendum

I found an additional one-celled nest (103158 A) in a stem of staghorn sumach at Dunn Loring, Va., on October 31, 1958, after this manuscript had gone to the printer. On this date the *Leptochilus* larva was constructing its cocoon from earthen particles in the upper plug. Beneath the larva was a layer of particles of fine pith and then a brood cell containing a moribund *Brachys* larva and remains of several other *Brachys* larvae.

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Rau, P. 1928. Field Studies in the Behavior of the Non-social Wasps. Trans. Acad. Sci. St. Louis, 25: 325–489, pls. 22–32.

Re Insects Borrowed by the Late Dr. V. S. L. Pate

In late October 1958, officials of the Academy of Natural Sciences of Philadelphia learned of the death of Dr. V. S. L. Pate. Arrangements were made with the executor of his estate to secure the numerous specimens borrowed by Dr. Pate over the past quarter century and assemble them at the Academy. This has been accomplished. The collection fills 147 Schmidt type boxes, 7 large drawers and 76 smaller boxes. It consists of approximately 28,000 pinned specimens and between 1,000 and 2,000 unpinned specimens of Hymenoptera, all belonging to an estimated 30–40 different owners. Considerably less than one percent of the specimens bears a label indicating ownership. About five percent of the containers evidenced signs of dermestid infestation, but much less than one percent of the specimens is totally destroyed.

Mr. James A. G. Rehn and the undersigned are arranging these specimens by owner wherever the label bears data which will permit the specimen to be assigned to a particular institution or individual. Needless to say, the ownership of many thousands of specimens is in doubt. The purpose of this note is to request individuals and officials of institutions which had made loans to Dr. Pate to communicate with the undersigned supplying the following information: 1) number of specimens loaned; 2) distinguishing label data (collector, area collected from, approximate dates, etc.); 3) Family (or other systematic category) to which specimens belong. Material which can be identified with its owner will be shipped express collect as soon as it can be conveniently packed. Material unclaimed, or impossible to assign to an owner before the end of 1959, will be incorporated into the collections of the Academy of Natural Sciences of Philadelphia.

HAROLD J. GRANT, JR.

Reviews

CHECKLIST OF THE MILLIPEDS OF NORTH AMERICA, by Ralph V. Chamberlin and Richard L. Hoffman, Smithsonian Institution, Washington, D. C. 1958. 236 pp. $1.00.

This annotated checklist of the class Diplopoda in North America north of Mexico is very timely, for the last one was published 65 years ago and listed only 124 species under 29 genera. This one brings together some 749 species and subspecies under 200 genera, 35 families, and 11 orders. Keys to families are included. The senior author, who first published on the group in 1903, is the author of more than one-half of the species and the genera that are listed.

This is a carefully done piece of work, having been in preparation several years, but it has the faults of any checklist that is based by necessity on scattered and incomplete records. Our knowledge of the millipeds is still in the descriptive stage and lags at least 50 or 75 years behind that of the Insecta. Careful collectors, especially in the Western States, probably will find many species that are not listed, and critical students will find abundant evidence for questioning many entries. Information on small-bodied forms is still very meager, and the limits of many families are still undefined.

In general, genera and species have been recorded as they were published; a few synonyms have been indicated, some unwisely. In their choice of names for the superorders the authors have been governed by priority and have resurrected Brandt's (1833) awkward Pentazonia and Helminthomorpha; Verhoeff's (1926) more descriptive Opisthandria and Proterandria will be favored by most students. They have wisely based ordinal and subordinal names upon the oldest and best known of the included families. The twelve recognized orders are more than European workers usually recognize, but seem logical. The family Choctellidae wisely has been moved from the order Cambalida to the order Spirostreptida, and the lysiopetalids have been reduced from ordinal to subordinal rank.—NELL B. CAUSEY, University of Arkansas.

INSECT MIGRATION, by C. B. Williams. Pp. xiii + 235, with 11 color illustrations, 22 photographs, 49 maps and diagrams. The Macmillan Co., New York, 1958. Price: $6.00.

This book gives a broader and more summarized treatment of migration than does the author's earlier "The migration of butterflies" (Edinburgh, 1930). Of the present work the author says in the preface that it is ". . . an attempt to bring together both old and new information in a more easily readable form and to discuss many of the problems raised."

Perhaps there is many an entomologist who, like the reviewer, knows only of the more spectacular migratory flights of a few species of Lepidoptera, Orthoptera, and Odonata, and vaguely conceives of them as exceptional occurrences due to local overabundance. Here one learns that migration is characteristic of a good many species, including also some Coleoptera, Hymenoptera, Diptera, Homoptera, and Heteroptera, and that the flights are regular occurrences, directional and deliberate. Although ordinarily it is the following generation, there are species, such as the monarch butterfly, in which it is the same individuals that make the return flight. One is reminded, especially when examining some of the photographs of flights and of aggregations, that here is something amazing and wonderful, and that for all we have learned about anatomy, development, hormones, effect of DDT on nerve cells, etc., etc., our insects still hold some baffling mysteries, and that we are still very far from comprehending the whole insect.

The nature of the migratory flights, especially how the insect adheres to its flight direction, remains unexplained. Williams finds it hard to believe that the sun may be used as a compass—because of its continual change of position—and suggests that various theories require further investigation, including the one involving terrestrial magnetism. As to the origin and the meaning of migration, he feels the most likely explanation may lie in seasonally recurring food shortages or other unbearable conditions; migration is a means of escape from these, comparable thus to some form of diapause.

The book is very readable throughout, and the very fine color plates, the many black and white photographs, the maps and

the diagrams all contribute greatly to its success.—R. G. SCHMIEDER.

DIE LARVALSYSTEMATIK EINIGER KLEINSCHMETTERLINGSFAMILIEN (Hyponomeutidae, Orthoteliidae, Acrolepiidae, Tineidae, Incurvariidae und Adelidae). Abhandlungen zur Larvalsystematik der Insekten. No. 2, pp. 1–145, 212 figs. Akademie Verlag, Berlin. Price: DM 19.50 (paper).

This is part of the comprehensive study of larval systematics of the Microlepidoptera being carried out at the Zoological Institute of the University of Erlangen. One part on the tortricids, by Swatscheck, has already appeared.

Families, sub-families, and genera are characterized on the basis of chaetotaxy, while for some species other features such as the bristles on the labrum, and head sutures are also used. A key to all families of microlepidoptera based on the keys of Facker and Gerasimo, with improvements, is presented, and the larval-based system is compared with that based on adults. —R. G. SCHMIEDER.

Books Received

MIDDLEKAUFF, W. W. The North American sawflies of the genera Acantholyda, Cephalica, and Neurotoma (Hymenoptera, Pamphiliidae). University of California Publications in Entomology, Vol. 14, No. 2, pp. 51–174, pls. 1–3, 105 figs. Univ. of Cal. Press, Berkeley and Los Angeles, 1958. Price: $2.50.

FORSTER, W. and TH. A. WOHLFAHRT. Die Schmetterlinge Mitteleuropas. Lieferung 9 and 10 (pp. 65–128 of Vol. III, and color plates Nos. 8–15). Franckh'sche Verlagshandlung, Stuttgart—0. Price: DM 10, per Lieferung.

These installments complete the Notodontidae, and cover the Zygaenidae, Cochlidiidae, Sphingidae, Thyatiridae, and Drepanidae.

OLDROYD, H. Collecting, preserving and studying insects. Pp. 1–327, 135 text-figures and 15 plates. The Macmillan Co., New York, 1958.

NOTICE. The December, 1958, issue of ENTOMOLOGICAL NEWS was mailed at the Post Office at Lancaster, Pa., on December 11, 1958.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Conopidae of the World wanted. Will pay 10¢ to $1.00 for pinned and labelled specimens. S. Camras, 4407 N. Milwaukee Ave., Chicago 30, Illinois.

Anisoptera—Nearctic sp. wanted for exchange, espec. Ophiog., Arigom., Aeschna, Neurocor., Somatoc., Cordulia, Dorocor., Leucor. R. D. Cuyler, Dept. of Entomology, N. C. State College, Raleigh, N. C.

Bembicini and Stizini (Hym., Sphec.) of New World wanted for revis. study. Will return upon request or at end of project. James E. Gillaspy, Dept. of Zoology, Univ. Texas, Austin 12, Texas.

Agapema galbina. Will exchange cocoons of this moth for nature books. E. Frizzell, Route 4, Box 96, San Benito, Texas.

Tenebrionidae of the World wanted, in exchange for insects of Argentina and neighboring countries. Horacio J. Molinari, Av. Lib. Gral San Martin 55, Acassuso (Buenos Aires), Rep. Argentina.

Butterflies. Wish to exchange specimens for Japanese species. Please write to Ichiro Nakamura (Boy, age 16), 26 Aza-Nichiyama Obayashi Takarazuka-shi, Hyogo-Ken, Japan.

Phasmidae of nearctic area desired alive. Purchase or trade, drawing on large stock of major orders, worldwide. Domminck J. Pirone, Dept. Entomology, Cornell University, Ithaca, N. Y.

Nitidulidae and Rhizophagidae wanted in exchange for European beetles of all families. O. Marek, Zămberk 797, Czechoslovakia.

INSECT COLLECTIONS FOR SALE

Lepidoptera (Smith Collection) : 48 families, 577 genera, 1447 species and 5855 specimens. 33 of 71 trays contain Noctuidae.

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Water Beetles (Dodge collection) : 6 families, 66 genera, 359 species and 1785 specimens.

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Peabody Museum, Salem, Massachusetts

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MEMOIRS OF THE AMERICAN ENTOMOLOGICAL SOCIETY

Number 16

A TAXONOMIC STUDY OF THE NORTH AMERICAN LICININI WITH NOTES ON THE OLD WORLD SPECIES OF THE GENUS DIPLOCHEILA BRULLE (COLEOPTERA)

By George E. Ball

258 pages of text, 75 tables, 3 diagrams, 15 plates, table of contents and index

This monograph considers the geographical variation, relationships, evolution and taxonomy of the carabid tribe Licinini. A general treatment, explaining the taxonomic approach used, definition of terms, criteria for delimiting species and subspecies, etc., precedes the systematic position. The genera *Diplocheila* (subgenera *Diplocheila, Neorembus, Isorembus*), *Dicaelus* (subgenera *Paradicaelus, Dicaelus, Liodicaelus*) and *Badister* (subgenera *Badister, Trimorphus, Baudia*) are each treated in some detail. Keys to the genera and species are given throughout as well as a description (or diagnostic notes), variation, distribution and frequently locality records for each of the forms treated. The phylogeny and zoogeography of each genus are discussed in a separate section. Variation of mensurable characters is treated in the 75 tables. Fifteen plates depict structural (including genitalia) and variational features of the species discussed.

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